

South Asia Biosafety Program

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BANGLADESH

Welcoming Dr. Rakha Hari Sarker to the South Asia Biosafety Program

Dr. Andrew Roberts, Chief Executive Officer, Agriculture & Food Systems Institute

The South Asia Biosafety Program (SABP) is very pleased to welcome Dr. Rakha Hari Sarker as the new Country Manager for SABP Bangladesh. Dr. Sarker is involved in teaching and research at the University of Dhaka, where he formerly served as Chairman of the Department of Botany. His academic interests include genetics, plant breeding, and biotechnology.

After completing his M.Sc. at the Department of Botany, University of Rajshahi, Dr. Sarker went on to obtain a Ph.D. from the University of Reading in the United Kingdom, where he had been awarded a Commonwealth Scholarship to pursue his studies. After receiving his doctoral degree, he pursued post-doctoral and advanced training in plant breeding, biotechnology, plant genetic engineering, and biosafety from the International Maize and Wheat Improvement Center (CIMMYT) in Mexico, the International Centre for Genetic Engineering and Biotechnology (ICGEB) in India, Cornell University in the USA, and in Germany.

Specializing in plant breeding and biotechnology, Dr. Sarker's research interests are in the improvement of crop plants using modern breeding techniques and biotechnology. He is also interested in propagation and characterization of medicinal plants, as well as indigenous plants of economic and environmental importance. He has published more than 100 research articles in several national and international journals, including *Proceedings of the National Academy of Sciences (PNAS)*, *New Phytologist*, *Euphytica*, *Cytologia*, *SABRAO Journal*, *Phytomorphology*, *Plant Cell, Tissue and Organ Culture*, *Journal of Phytopathology*, *Current Plant Biology*, *Frontiers in Plant Science*, *In vitro Cellular & Developmental Biology-Plant*, and the *Indian Journal of Agricultural Science*. He is a co-author of four books published by international publishers, as well as *Wealth of Bangladesh: Medicinal Plants*, which was published by the National Museum of Science and Technology, Bangladesh. In 2018, he received the Bangabandhu National Agriculture Award, the highest state award given by the government of Bangladesh, for his contribution to research in agricultural sciences. He was also a member of the Governing Body of National Institute of Biotechnology (NIB).

In addition to assuming the role of Country Manager for SABP Bangladesh, Dr. Sarker is also one of the editors of the *Bangladesh Journal of Botany (BJB)* and the Executive Editor of *Plant Tissue Culture and Biotechnology Journal (PTC&B)*, published by the University of Dhaka. He also serves as Director of Dhaka University Centre for Advanced Studies and Research in Biological Sciences, the Chairperson of Institutional Biosafety Committee (IBC) of the University of Dhaka, and President of the Bangladesh Association for Plant Tissue Culture and Biotechnology (BAPTCT&B). He is a scientist member of the National Executive Committee on Biotechnology (NECB) and member of the Core Committee of the National Technical Committee of Crop Biotechnology (NTCCB) of the



Dr. Rakha Hari Sarker (December 2021).

Government of the People's Republic of Bangladesh (Under the Ministry of Agriculture). He is a life member of the Bangladesh Botanical Society and Bangla Academy, and member of the Bangladesh Association for Plant Tissue Culture & Biotechnology, Asiatic Society, Global Network of Bangladeshi Biotechnologists, Bangladesh Biosafety and Biosecurity Society, and International Association for Plant Biotechnology.

Dr. Sarker will officially join SABP on January 1, 2022, when he will take over responsibility for the SABP office in Dhaka. From there, he will oversee activities in Bangladesh, advancing the mission of SABP to work collaboratively with stakeholders and the Government of Bangladesh to strengthen institutional governance of biotechnology. SABP is delighted to have someone of Dr. Sarker's experience and caliber join us in this role.

Webinar on Microbial Biotechnology for Novel Food and Food Ingredients



India has seen significant growth in its food processing industry in recent years. Rising incomes and urbanization has increased interest in convenience foods such as cereals and baked goods, and growing the value-added food processing industry could help reduce waste of perishable produce. Food ingredients are an essential part of the global food supply and international trade, and microbial fermentation is used to make purified flavors, vitamins, amino acids, and other compounds for the food industry. Producers around the world use microbe-derived products because they provide yield, purity, cost competitiveness advantages, and potential resource conservation.

Microbial biotechnology, including techniques other than genetic engineering, is one technology used to produce products of microbial fermentation. In the food industry, it is used to produce a range of foods, beverages, and their ingredients. Supported by a grant from the New Technologies and Production Methods Division at the U.S. Department of Agriculture (USDA) Foreign Agricultural Service (FAS) Trade Policy and Geographic Affairs (TPGA) area, the Agriculture & Food Systems Institute (AFSI) and Biotech Consortium India Limited (BCIL) are jointly organizing a webinar to convene scientists and policymakers from academia, industry, and government to discuss regulatory policies and science communication around low-risk, well-characterized food ingredients that have been derived from genetically modified microbes, algae, and fermented products. By bringing experts together to discuss science-based, transparent functional biotechnology regulations of products derived from microbial biotechnology, this event will help foster a shared understanding of the nature of these products and the proportionate risks associated with them in the context of food.

After a brief welcome and introduction by organizers, the plenary session will begin with a discussion of emerging trends in India's food processing industry, followed by a presentation on the science of microbial biotechnology. The program will then shift to regulatory requirements for food ingredients and processing aids, including those derived from microbial biotechnology, before concluding with some firsthand experience of navigating the regulatory system in India. The event will conclude with a moderated panel discussion, providing an opportunity for participants to ask questions.

View the Agenda and Session Information:
foodsystems.org/event/mbnf-india/

Register:
foodsystems-org.zoom.us/webinar/register/8316394783036/WN_yaiH2ea6QyKvPXgBQKb8GA

FSSAI Draft Notification Regarding Food Safety and Standards (Genetically Modified or Engineered Foods) Regulations, 2021

Food Safety and Standards Authority of India (FSSAI) issued Notification F.No.1/Standards/GM Food regulation/FSSAI/2018 on November 15, 2021 for "Draft Food Safety and Standards (Genetically Modified or Engineered Foods) Regulations, 2021" for comments. The notification was published in the *Gazette of India* on November 17, 2021. The draft regulations cover the following topics:

- Definition of GM food and GMOs
- Prior approval for the manufacture, storage, distribution, sale, and import, etc., of genetically modified food products.
- Procedure for granting of prior approval.
- Food laboratory for genetically modified foods testing.
- Function of foods laboratory for genetically modified foods testing.
- GM food labelling.
- Applicable forms for approval

The comments received by the FSSAI on the draft regulation during inter-ministerial consultation have also been provided. The timeline to provide comments is 60-days. The notification and related documents can be accessed at: <https://fssai.gov.in/notifications.php?notification=draft-notification>.

Pan-Genome for Chickpea for Setting Up Breeding Revolution

Dr. Rajeev Varshney and Dr. Rohit Pillandi, International Crops Research Institute for the Semi-Arid Tropics (ICRISAT)



Diversity in chickpea. © ICRISAT

Grown in more than 50 countries, chickpea is the world's third-most cultivated legume. An international team of researchers from 41 organizations has assembled chickpea's (*chana*) pan-genome by sequencing the genomes of 3,366 chickpea lines from 60 countries. This includes 3,171 cultivated accessions and 195 wild accessions of chickpea that are conserved in multiple gene banks, representing chickpea's genetic diversity in a much larger global collection. Led by the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), the team identified 29,870 genes that includes 1,582 previously unreported novel genes. The research is the largest effort of its kind for any plant, putting chickpea in a small group of crops with such an extensive genome map.

Prof. Rajeev Varshney, a Research Program Director at ICRISAT and leader of the study that was published on November 10, 2021 in the scientific journal *Nature*, indicated that this research provides a complete picture of genetic variation within chickpea and a validated roadmap for using the knowledge and genomic resources to improve the crop.

Dr. Trilochan Mohapatra, Director General, Indian Council of Agricultural Research (ICAR) has indicated that "the demand for chickpea is set to increase in the coming years as the world's population rises. Research like this is the need of the hour to help major producing countries like India boost crop production while making crops climate-resilient."

The study identified blocks of genes in landraces [...] that can significantly enhance performance of the crop by improving traits like yield, climate resilience, and seed characteristics.



A chickpea plant and pods. © ICRISAT

Comparison of the genetic variation in cultivated chickpea with that of its wild progenitor has helped the researchers identify deleterious genes responsible for lowering crop performance. These deleterious genes were more abundant in the wild progenitor as they would have been purged to some extent in cultivated lines through selection and recombination. Researchers state that these deleterious genes can be further purged in cultivars using genomics-assisted breeding or gene editing.

Furthermore, the study identified blocks of genes in landraces (domesticated varieties developed by farmers) that can significantly enhance performance of the crop by improving traits like yield, climate resilience, and seed characteristics. Called haplotypes, these blocks of genes are what crop breeders strive to bring into cultivars. Using historical data of all chickpea varieties released between 1948 and 2012, the research sheds light on the deployment of these haplotypes in the varieties.

To take the study's findings to the farm, the authors proposed three breeding approaches based on genomic prediction that aim at improving 16 traits and enhance chickpea productivity. They demonstrated that the approaches work by applying them for enhancement of 100-seed weight, a critical yield trait, and predicting an increase ranging between 12-23%.



Chickpea in the field. © ICRISAT



Study lead Rajeev Varshney in a chickpea field. © ICRISAT

GM Soybean: Status and Biosafety Aspects – A Webinar Co-Organized by the ICAR-Indian Institute of Soybean Research and Biotech Consortium India Limited

Dr. Vibha Ahuja, Biotech Consortium India Limited

GM Soybean: Status and Biosafety Aspects was a webinar organized jointly by the ICAR-Indian Institute of Soybean Research (IISR), Indore and Biotech Consortium India Limited (BCIL), New Delhi on November 29, 2021, with the aim of creating awareness among scientists and other stakeholders engaged in soybean research, production, processing, and using soybean products for food and feed purposes. Presentations and remarks were delivered by scientists and experts in soybean research, GM crops, biosafety issues, and animal feed requirements. The webinar was attended by senior scientists, members of regulatory committees, industry, and researchers.

In her opening remarks, Dr. Nita Khandekar, Director, ICAR-IISR emphasized the need for using advanced technologies, including genetic engineering and gene editing, for soybean crop improvement, as productivity must be increased to meet the growing demand. She remarked that traits should be introduced based on the problems faced in the country, such as pest resistance, disease resistance, and drought tolerance. Dr. Milind B. Ratnaparkhe, Principal Scientist, IISR presented an overview of GM soybean and the status of cultivation and research. He informed participants that commercially approved GM soybean have traits including herbicide tolerance, insect resistance, and nutritionally improved oil composition. IISR is also using molecular breeding and transgenic approaches to develop new varieties, particularly drought-tolerant varieties.

Dr. Sujit K. Dutta, Joint Commissioner, Department of Animal Husbandry and Dairying spoke about nutritional requirements of the livestock sector and challenges being faced. He emphasized that demand for animal protein has increased greatly in recent years, which is still lower than WHO standard per capita consumption. He stressed the need to increase production of GM crops in India, including soybean, to counter the soaring domestic prices. He also indicated that GM crops are being used all over the world by the animal feed industry, and the same can also be used in India to enhance soymeal availability.

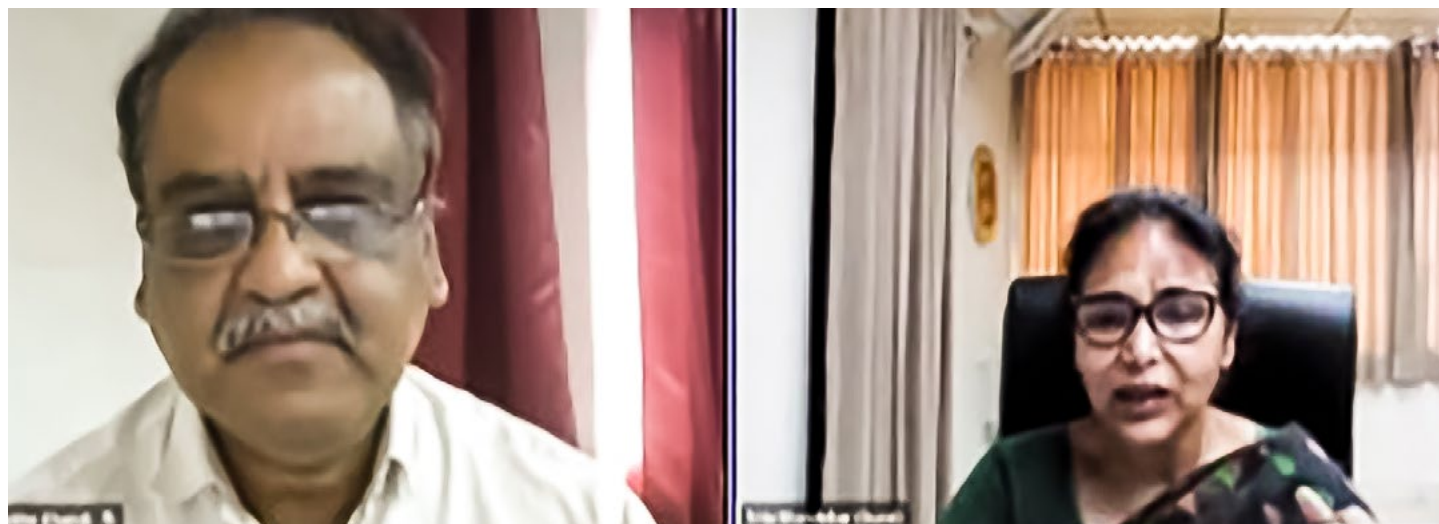
Dr. Amrith Kumar Tyagi, Assistant Director General (Animal Nutrition & Physiology), ICAR discussed the nutritional deficit in animal feed, particularly in the dairy sector and the subsequent impact on milk production. He stressed the need for appropriate feeding studies of GM crop products before adoption as food and feed.

Dr. B. Dinesh Kumar, Scientist 'G' Director grade (Former), ICMR-National Institute of Nutrition (NIN), informed participants that compositional analysis, toxicity studies, and allergenicity studies are carried out as part of safety assessment of GM crops. He shared examples of various studies undertaken at NIN for GM crops developed in India, viz. brinjal, mustard, okra, cotton, etc.

Dr. Vibha Ahuja discussed the global status of GM crops and informed participants that products of GM crops are being traded across more than 70 countries. She highlighted the fact that biosafety concerns of various stakeholders regarding GM crops can be broadly categorized as scientific and non-scientific concerns. While internationally accepted methodologies and a well-structured regulatory framework is available in the country to address scientific concerns, the non-scientific concerns are apprehensions based. As a result, there is polarized debate in the country, which has resulted in delays in decision making and hampered research and field trials of GM crops. She observed that the application of new technologies and adoption of GM crops is urgently required for dealing with the increasing demand for various agricultural crops.

The key points that emerged from the deliberations are as follows:

- Out of the total of all soybean grown in the world, GM soybean is grown on more than 78% of the area. In top soybean producing countries, GM crop adoption rate is ~96%. Commercially cultivated GM soybean includes herbicide resistant, insect resistant, and high oleic acid content soybean. Drought tolerance is another key area in which research for developing GM soybean is going on.
- Soymeal is a key component of animal feed sectors viz. poultry and fisheries (particularly shrimp) being important users. India lags in animal feed production, resulting in volatile markets. Use of GM crop derivatives in animal feed as a protein source can help in improved availability for the livestock sector.
- GM crops are cultivated and traded globally, and their adoption in India is the need of the hour. Due to polarized debate, approvals have been delayed and the number of field trials has reduced significantly.
- Enhancing investments in research and enabling policy environments for use of novel technologies can help in meeting various challenges and increasing productivity.



Dr. Nita Khandekar, Director, ICAR-IISR and Dr. Milind B. Ratnaparkhe, Principal Scientist, IISR at the webinar GM Soybean: Status and Biosafety Aspects (November 29, 2021).

CALENDAR OF EVENTS

EVENT	ORGANIZED BY	DATE	WEBSITE
INDIA			
International Conference on Vegetable Research and Innovations for Nutrition, Entrepreneurship, and Environment (ICVEG-21)	Indian Society of Vegetable Sciences, Varanasi	December 14-16, 2021 Varanasi (in person and online)	https://icveg21.isvs.org.in
National Symposium on Emerging Innovations in Plant Molecules for Achieving Food and Nutritional Security	Navsari Agricultural University	January 6-7, 2022 Navsari, Gujarat	https://nau.in/index
International Conference on Biotechnological Initiative for Climate Resilient Agriculture	Dr. Rajendra Prasad Central Agricultural University, Pusa (Samastipur)	January 7-9, 2022 Pusa (in person and online)	https://www.rpcau.ac.in/ Registration link: https://forms.gle/JpjuVGM5TcFPwyL7
Winter School on Innovation in Potato Improvement, Production, and Utilization Technologies for Doubling Farmer's Income	ICAR-Central Potato Research Institute, Shimla	January 18-February 7, 2022 Shimla	https://cpri.icar.gov.in/
International Conference on Harnessing the Potential of Finger Millet for Achieving Food and Nutritional Security: Challenges and Prospects (ICFM-2022)	University of Agricultural Sciences, Bangalore	January 19-22, 2022 V.C. Farm, Mandya	https://www.milletres.in http://uasb-icfm2022.in https://www.uasbangalore.edu.in
International Conference on Sustainability of the Sugar and Integrated Industries: Issues and Initiatives (SUGARCON-2022)	ICAR-Indian Institute of Sugarcane Research, Lucknow	February 16-19, 2022 Lucknow	https://iisr.icar.gov.in/iisr/
43 rd Annual Meeting of Plant Tissue Culture Association-India (PTCA-I) & International Symposium: Advances in Plant Biotechnology and Nutritional Security (APBNS-2022)	ICAR-National Institute for Plant Biotechnology, New Delhi	February 17-19, 2022 New Delhi (in person and online)	http://www.nrcpb.res.in/
National Symposium on Ornamental and Edible Horticulture: Emerging Challenges and Sustainable Goals	Bidhan Chandra Krishi Viswavidyalaya	February 21-22, 2022 Nadia, West Bengal	https://www.bckv.edu.in/index.php/en/
INTERNATIONAL			
16 th ISBR Symposium (ISBR 2022)	International Society for Biosafety Research	April 10-14, 2022 St. Louis, MO, USA	https://isbr.info/symposium-welcome



SOUTH ASIA
BIOSAFETY PROGRAM

The South Asia Biosafety Program (SABP) is an international development program implemented in India and Bangladesh with support from the United States Agency for International Development (USAID). SABP aims to work with national governmental agencies and other public sector partners to facilitate the implementation of transparent, efficient, and responsive regulatory frameworks for products of modern biotechnology that meet national goals as regards the safety of novel foods and feeds, and environmental protection.



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